Writing A
Scientific Paper

**Midway through the exam,
Allen pulls out a bigger brain.**

Final paper

- 12-15 pages, doubled space (~ 4000 words).
- 1/3 intro, 1/3 method, 1/3 results/discussion
- Take intro from paper 2, and add a summary of exp 1 in the intro, as a journal article (you quote yourself and shortly describe the study).
- Hypotheses of Expe 2
- Methods of Exp 2 / Results
- Discussion: only exp2 or exp1 and 2 together

General

- Double spaces
- Allow 1 inch margin on both sides, top and bottom
- Don't right justify
- Type is 11- 12 points

- Most papers: ~ 4000 words

Abstract

- Include aspects of all part of a paper: 150-250 words
- Introduction
- Principal Hypothesis
- Experimental method
- Result (No statistics in the abstract)
- Interpretation
- Conclusion

An abstract is self-contained: reader can tell from the abstract what the paper is about

Introduction

- State the problem (the question)
- Put the problem in a theoretical context (in regard to other theories/articles)
- Cite earlier work on the question

- State what the study will contribute to understanding the question
- At the end of the introduction, state the principal hypotheses of the study

Method- General

- Another person could replicate your study based on a reading of your method section

- A reader could evaluate your study well enough to tell whether your conclusion are valid

- Method: sometimes you introduce at the beginning of the method section the task/experiment you did

- Often, you give 1-2 sentences summary of your results

Method sections

- <u>Participants</u>: describe the participants, their number (per condition or group), the population (students, participants on the web from a specific list). Tells how the participants were selected.

- <u>Materials</u>: list equipment, computer program, questionnaire used. If apparatus (or a program) is specialized, refer to articles describing it.

Method sections

- <u>Design:</u> describe the logic of the experiment. Lists independent variables (termed factors in an article), their levels (conditions), and the dependent variable(s).

- <u>Procedure</u> : describes the exact steps in carrying out design (what the participants did) – procedure subsection may be incorporated into design

  List method of controls, such as randomization or counterbalancing or additional controls of the stimuli (luminance, etc). Summarize or reproduce any instructions to participants (also in Appendix)

Results

- Describes any transformation made on the data (e.g. from HIT and FA, compute d')
- Explain any data that were eliminated from the analysis
- Statistics: names any statistics used, gives statistical significance of the results
- BE CAREFUL: focus on describing the data, not the statistics.
- State the effect of variable X (or interaction) was significant:
- ($F(1,117)=4.71$, $p < .05$). P values used in articles are: $p < .05$, $p < .01$, $p < .02$, $p <. 001$, $p <. 0001$.
- Do not write the F value if the statistics is not significant (say: effect of factor X was not significant. When $F < 1$, sometimes people say so)
- For a 2 x 2 design, states the 3 statistics IF RELEVANT, and put the mean of the conditions in the text
- Does not let description of statistics substitute for a description of results
- Generally avoid describing trends or data points that are not statistically significant

Results Presentation

- Use a graph or a table (not both) to present a set of data
- State principal findings clearly: a difficult part: depending on the results, you will emphasize some hypothesis/statistics, and/or absence of effects. A case by case
- Avoid description of individual subjects
- Does not repeat in the text details information found in table or figure

Interpretation

- <u>Clearly</u> states whether hypotheses were supported
- Interpret results: only interpret significant results: if only the interaction is significant, only interpret the interaction.
- Write very very clearly
- Avoids introducing further results
- Did I say to be clear?

Discussion

- Relates results to those of others
- Cites other work discussed
- Relates results to theory
- Discuss limitations and weakness of results
- Discuss implications for further research
- Suggest applications of findings when appropriate
- Avoids undue speculations

References

- Starts on a new page
- Include every citation in text, and vice versa
- Does not include any references not cited
- Are in alphabetical order

Acknowledgments and Appendix

- Thanks people who helped you, particularly if a member of your team did a particular work (e.g. writing a program, findings 100+ participants on the web)

- Thanks the funding

- Add your email and web site if relevant

- Appendix: put questionnaires, instructions and additional figures of stimuli if relevant

Tips about how to start writing a paper

(the fear of the white page)

Step 0

- Organize your working environment
- Be sure you have <u>a minimum of</u> 2 hours (4 hours is good) in front of you, without any interruption
- Close your email box …
- Be in a place you like working
- Have all your papers (for citations) with you
- Choose a gift you will offer to you after you are done with the first draft of the paper

Step 1: Filling the white document fast

- If you have made a talk or a poster, start by copying/pasting the talk/poster into a document
- Format the document (cf previous sections)
- Made very nice and clear graphs and/or tables for the different sections
- The figures represent the *storyboard* of your paper: readers should be able to understand your paper by looking at the set of figures and reading only the captions.

Step 2: Make the document pretty

- Write a title (not the final title, as the title is often changed after writing the paper)
- Write your name (+ co-authors), and affiliation
- Write the title of the sections and subsections needed: Abstract, Introduction, Methods (participants, design, procedure), Results, Interpretation, Discussion, References

Step 3: Start by the very easy part

- References: most of the time, you know the papers you will quote, so put them in references now (in the right format)

- What do you know for sure? The method.

- Start by filling up the whole method section

Step 4: Continue with descriptive part

- Then, as you already have your graphs/figures: add the captions of the figures/tables

- Write a first draft of the results (and a little bit of interpretation) part and add the statistics

- Take a long break

Step 5: more descriptive part

- Revise your writing of the results and interpretation sections.

- Check out/rewrite the hypotheses (at the end of the introduction) and come back to the results description, then hypotheses again: make the two coherent. You do not change your hypotheses, but you revise them to emphasize important aspects of the results (or absence of results).

- Write/Revise the 2 sentences at the end intro/beginning method about your main and important finding.

Step 6: the triple burger stage

- Take a good break
- Write the introduction (and sometimes fill up part of the discussion, particularly if you are referring to the same articles in the discussion)
- Take a break
- Write the discussion
- Look again at your introduction
- Again the discussion
- Take a break
- Revise the discussion
- Revise the introduction
- Take a break

Step 7: Do not work on the paper for 1 or 2 days

Step 8: The summary

- Read *everything*, make local corrections, details

- Write the abstract one time (cf. tips about how to write the abstract).
- Revise the abstract a second time
- Revise the abstract a third time
- Revise the abstract a 4rth time …

Step 9: The last reading

- Read everything and make additional changes and corrections (you are so happy that the figures captions and the references are done)

- Check the format (APA style, format of title)

- Often, you will redo some of the figures because you are a perfectionist

Step 10: Let it goes

- Give the article to the instructor or to other people for comments.
- Get your gift
- If you are in graduate school (or you are a professor), go back to Step 5 and loop steps 5-10 at least three times
- Eventually: 1 page (single spaced) ~ 10 hours of work.

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